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INDIANAPOLIS, IN
07/28/1999

Decision Document

for

Transferable Portion of AOC 7 - East - West Storm Sewer

Naval Air Warfare Center

Indianapolis, Indiana

Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

Contract Task Order 0012

July 1999

DECISION DOCUMENT
FOR
TRANSFERABLE PORTION OF
AOC 7 - EAST - WEST STORM SEWER

NAVAL AIR WARFARE CENTER
INDIANAPOLIS, INDIANA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
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CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0012

JULY 1999

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NUMBER **PAGE NO.**

ACRONYMS

AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirements
BCT	BRAC Clean-up Team
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIP	Community Involvement Plan
CFR	Code of Federal Regulations
COPC	Chemicals of Potential Concern
DCE	Dichloroethene
IDEM	Indiana Department of Environmental Management
IR	Installation Restoration
mg/kg	milligram per kilogram
NAVFAC	Naval Facilities Engineering
NAWC	Naval Air Warfare Center Command
NCP	National Contigency Plan
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene
PRG	Preliminary Remediation Goal
RAB	Restoration Advisory Board
RBC	Risk Based Concentration
RI	Remedial Investigation
RCRA	Resource Conservation and Recovery Act
SOUTHDIV	Southern Division, Naval Facility Engineering Command
SSL	Soil Screening Level
TCA	1,1,1-Trichloroethane
TCE	Trichloroethene
USEPA	U.S. Environmental Protection Agency
USGS	United States Geological Survey
VOC	Volatile Organic Compound

1.0 DECLARATION OF THE DECISION DOCUMENT

1.1 SITE NAME AND LOCATION

AREA OF CONCERN SEVEN (AOC7)
TRANSFERABLE PORTION OF EAST-WEST STORM SEWER
NAVAL AIR WARFARE CENTER (NAWC) INDIANAPOLIS
INDIANAPOLIS, INDIANA

1.2 STATEMENT OF BASIS AND PURPOSE

This Decision Document presents the selected remedial action for the transferable portion at the East-West storm sewer (AOC7) at the NAWC Indianapolis, Indianapolis, Indiana, developed in accordance with CERCLA, as amended by SARA, to the extent practicable, and the National Contingency PIan. This decision is based on the administrative record for this Site, at the Warren Library, Indianapolis, Indiana.

The State of Indiana and the U.S. EPA concur with the selected remedy.

1.3 ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Decision Document, may present an imminent and substantial endangerment to public health, welfare, or the environment.

1.4 DESCRIPTION OF THE SELECTED REMEDY

AOC 7 encompasses contamination in the transferable portion at the East-West storm sewer. Based on current Site conditions, it has been determined that future risk to human health and the environment would be within acceptable limits assuming continued industrial use of the property. Therefore, no further remedial action beyond the implementation of those institutional (i.e. land use) controls specified in this document is planned.

The major components of those institutional controls selected for implementation include:

- Restricting future land use to non-residential purpose to specifically include, but not limited to, the prohibition of playgrounds, day care facilities and facilities for the elderly.

- Retention of a right of access by the Navy, and Federal and State regulators for purposes of undertaking future environmental investigations, inspections and/or remedial actions.

1.5 STATUTORY DETERMINATION

Because this remedy will result in the contamination remaining on-site, the Navy will conduct a review every five years after the commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

1.6 DECLARATION

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes alternative solutions and treatment technologies to the maximum extent practical for this site. However, because active treatment of the principal threats of the site was not found to be practical, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The size, location, and amount of contamination found at AOC 7 precludes a remedy in which contaminants could be treated effectively.

Carl Loop — 9/2/99 Date
Carl Loop, US Navy, Southern Division (SOUTHNAVFACENGCOM)
BCT Member

Concurrence:

Denise Boone — 9/8/99 Date
Denise Boone, USEPA, Region V
BCT Member

Sean Grady — 9/2/99 Date
Sean Grady, Indiana Department of Environmental Management
BCT Member

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND DESCRIPTION

NAWC Indianapolis is located in Marion County, east of downtown Indianapolis within a predominantly residential/commercial area (See Figure 2-1). NAWC Indianapolis is bordered by East 21st Street to the north, Arlington Avenue to the west, East 16th Street to the south, and a small waterway, Windsor Branch, to the east. Most of the commercial establishments within the immediate vicinity of NAWC Indianapolis are located along East 21st Street or Arlington Avenue. Businesses in the area include gas stations, car washes, dry cleaners, and office buildings. The areas immediately beyond the businesses lining East 21st and Arlington Avenue are predominantly residential, as are the areas south and east of the NAWC.

In late 1995, the Department of Defense decided to place the NAWC Indianapolis on the base realignment and closure list. This initiated the conversion of the facility from a government-owned and operated facility to the private sector. The NAWC Indianapolis is currently under the direction of Raytheon, under lease from the City of Indianapolis, who, in turn, leases the property from the U.S. government. Figure 2-2 shows a layout of NAWC Indianapolis and the location of AOC 7.

The ground surface at NAWC Indianapolis is generally flat, sloping slightly from the northern boundary toward the southeast. Surface water drainage at the facility mostly occurs as overland flow during heavy precipitation events. This overland flow is collected and routed through a storm sewer system to two discharges locations: (1) a nearby stream to the southeast of the facility via permitted spillways and an off-site storm sewer system; and (2) a water retention pond in the southwest portion of the site. The retention pond was constructed to facilitate surface water infiltration and to alleviate ponded water on the facility grounds.

The unconsolidated glacial overburden is approximately 150 feet thick at the facility and is comprised of three aquifers or aquifer zones, namely the shallow aquifer zone, middle aquifer and deep aquifer. Each of these varies in thickness, composition, and horizontal extent throughout the site area. The shallow aquifer may be unconfined or semi-confined in some areas where it is near to the ground surface or where it is not overlain by till or other low permeability materials. The shallow aquifer ranges in thickness from 0.5 to 25 feet; the middle aquifer ranges in thickness from 1 to 34 feet; and the deep aquifer ranges in thickness from 5 to 26 feet. The shallow and middle aquifers are only believed to be horizontally continuous on the eastern and southern portions of NAWC Indianapolis, whereas the deep aquifer is

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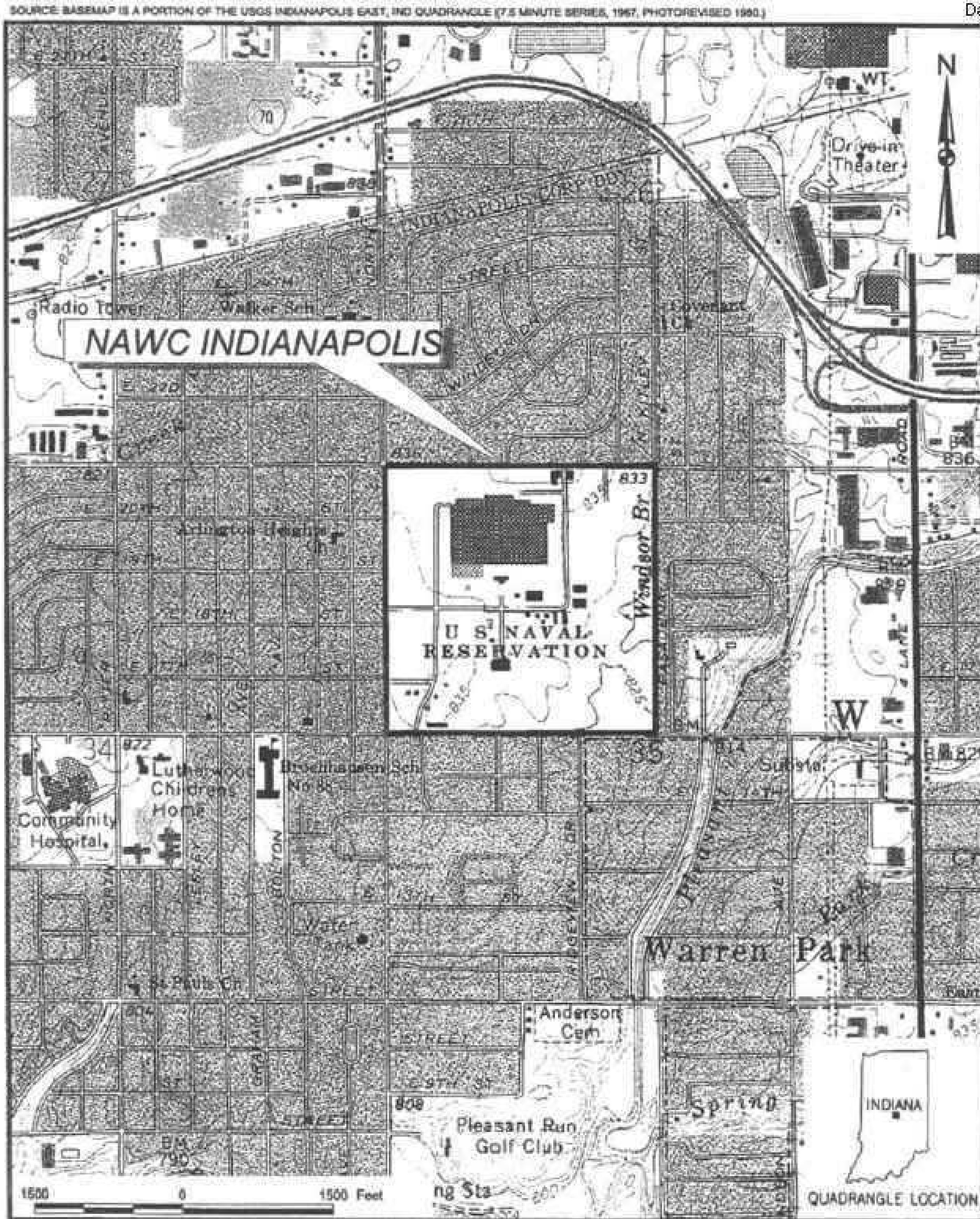
SOURCE: BASEMAP IS A PORTION OF THE USGS INDIANAPOLIS EAST, IND QUADRANGLE (7.5 MINUTE SERIES, 1967, PHOTOREVISED 1980.)



DRAWN BY D. PERRY / DATE 12-SEP-98		SITE LOCATION MAP	CONTRACT NUMBER —
CHECKED BY / DATE		DECISION DOCUMENT	APPROVED BY / DATE 7/1/99
COST/SCHEDULE-AREA		NAVAL AIR WARFARE CENTER INDIANAPOLIS	APPROVED BY — / DATE —
SCALE AS NOTED		MARION COUNTY, INDIANA	DRAWING NO. FIGURE 2-1 / REV 0

P:\GIS\57173\7173_PROPOSED_PLAN.APR 17-NOV-98 DMF LOCATION MAP LAYOUT

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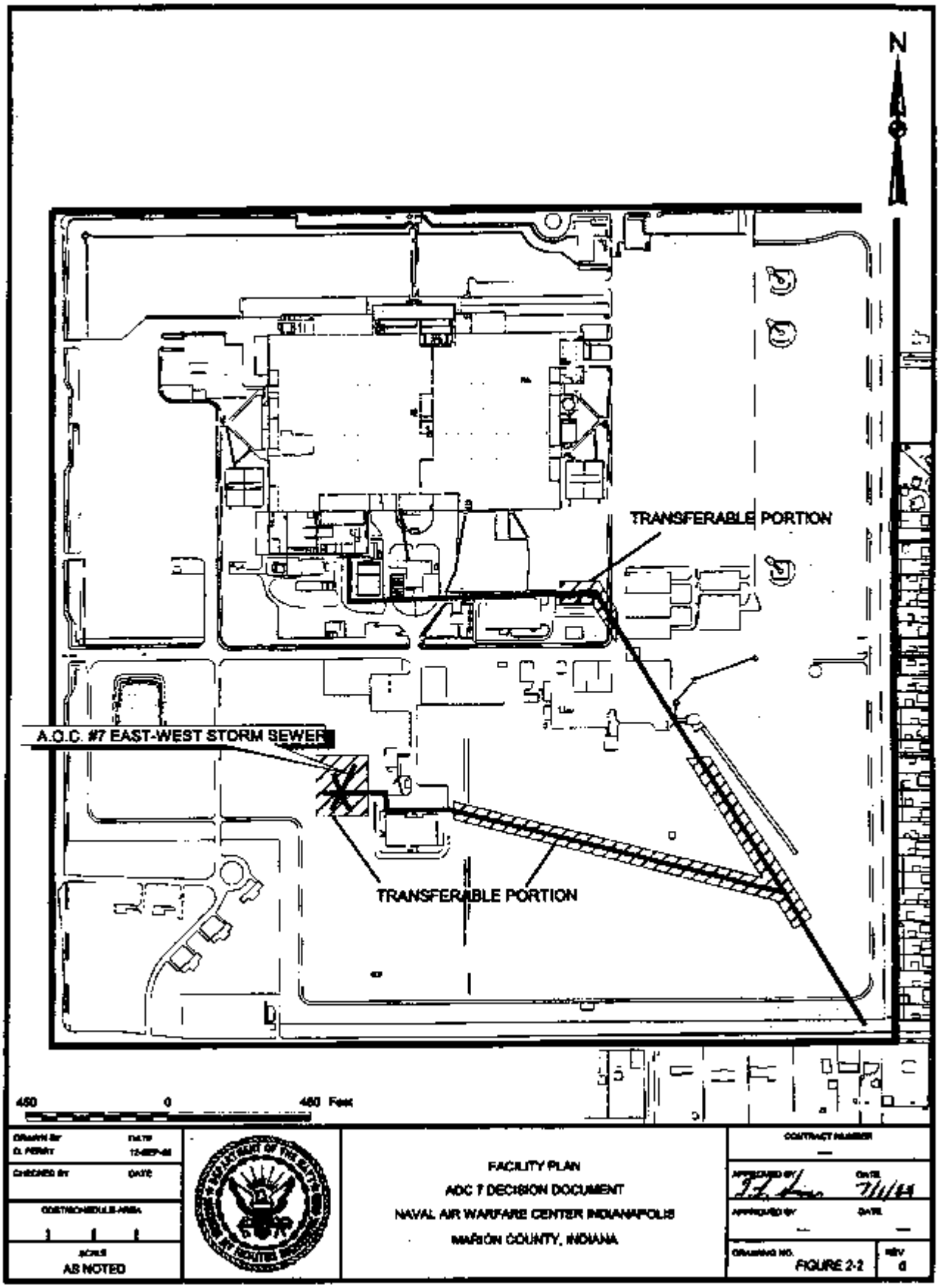
N
TRANSFERABLE PORTION
A.O.C. #7 EAST-WEST STORM SEWER
TRANSFERABLE PORTION
450
0
450 Feet
FACILITY PLAN
AOC 7 DECISION DOCUMENT
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA
AS NOTED
FIGURE 2-2

expected to be horizontally continuous throughout the entire NAWC. Each of these aquifer zones are separated by low permeable glacial till aquitards. The aquitard between the shallow and middle aquifers ranges in thickness between 15 to 19 feet and the aquitard between the middle and deep aquifer ranges between 23 and 41 feet thick.

The groundwater flow direction across the facility in the shallow and middle aquifer zones is generally to the southeast and south, while flow in the deep aquifer is southwest. It is likely that groundwater in the shallow aquifer discharges into Windsor Branch and Pleasant Run to the east and southeast of the facility. The average horizontal hydraulic gradient for the shallow aquifer was 0.0071 ft/ft on December 10, 1996 and 0.0116 ft/ft on September 27, 1997. The average horizontal hydraulic gradient is 0.014 ft/ft in the middle aquifer, and 0.005 ft/ft in the deep aquifer. The average vertical gradient between monitoring wells screened in the shallow and middle aquifer is 0.5 ft/ft downward in the north-central and southern edges of the NAWC. Between the shallow and middle aquifers, the average vertical gradient in the northeastern corner of the NAWC is 0.13 ft/ft upward. This upward gradient indicates potential recharge of Windsor Branch immediately east of the NAWC from the shallow aquifer. The average hydraulic gradient between the middle and the deep aquifer is 1.3 ft/ft. For additional information on the geology and hydrogeology at the NAWC Indianapolis please refer to B&R Environmental (1997) and USGS (1997, 1998).

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The main east-west storm sewer had a history of receiving non-storm discharges through sewer cross ties. Cross ties between the sanitary sewer and the storm sewer have historically been corrected as they are identified, however it is known that, temporarily, the public works paint booth water curtain air pollution control device discharged wastewater containing paint solvents to the storm sewer. This storm sewer branch then discharged into the sanitary sewer, prior to correction. Reportedly, the water curtain discharge was corrected prior to the cross tie correction, so that water curtain discharge has only been discharged off site via the sanitary sewer, and not the storm sewer. Volatile organics would be present from water curtain operation.

The storm sewer is constructed of an unknown material. There is a drainage field in the area of the public works paint shop which is tied into the storm sewer system.

In January 1995, 660 gallons of paint booth washwater were repeatedly released from the Building 9400 sump when the sump overflowed. The runoff entered an UST excavation, where 360 gallons were

recovered. Additional investigation of the UST site was addressed in the UST remediation/investigation. It is not likely that any liquid entered the storm sewer since the UST excavation was below grade.

Parts of the sewer run beneath other AOCs or areas potentially affected by other AOCs. These areas, described in other documents, are not yet available for transfer to the City of Indianapolis. The parts of the sewer that are not potentially affected by other AOCs can be transferred. The segments that are transferable are shown on Figure 2-2.

The NAWC Indianapolis, under the office of the Chief of Naval Operations (CNO) initiated an Environmental Compliance Evaluation (ECE) program to identify environmental compliance deficiencies, provide recommendations for corrective action, and establish a basis for future budgets. The first ECE was performed in October 1991. The next ECE was performed in 1994, at which time a total of 21 environmental media/program areas were evaluated. The ECE's are maintained on site. Environmental programs and procedures were typically updated to meet ECE deficiencies.

In anticipation of the transfer from the government to the private sector, an Environmental Baseline Survey (EBS) was prepared by Brown & Root (B&R) Environmental (March 1996) to document the results of a modified Phase I environmental site assessment. The site assessment was performed in accordance with the U.S. Department of Defense (U.S. DOD) requirement for property intended to be sold, leased, transferred or acquired. The EBS reported findings on the status of the NAWC Indianapolis property and off-base property based on visual inspections and a review of records.

The Remedial Investigation began with the collection of Phase I environmental samples from October through December 1996. Additional samples were added in September 1997. A Phase I Remedial Investigation report was issued in December 1997 which presented the analytical results and evaluated the potential human health risks associated with the NAWC facility. Based on these findings, additional Phase II samples were collected at selected areas during the spring and summer of 1998.

2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

A Community Involvement Plan (CIP)(May 1997) was developed for NAWC Indianapolis that identifies a program to establish communication and information exchange between the Navy, and various federal, state and local agencies, and community agencies; and the public. Specifically, this provides a mechanism for the exchange of information between the BRAC Cleanup Team (BCT) and the public,

primarily through the Restoration Advisory Board (RAB). The BCT and RAB periodically hold public meetings to provide full exchange of information and to provide an opportunity for public comment.

The Navy solicited input from the community for the proposed plan on the selected alternative for each response action. The Navy originally set a public comment period from September 28, 1998 to October 27, 1998 and later extended it until November 11, 1998, to encourage public participation in the selection process. The comment period included a public meeting at which the Navy, with the EPA and IDEM, presented the Proposed Plan, answered questions, and accepted both oral and written comments. The public meeting was held on October 14, 1998 from 7:00 PM to 9:00 PM at the Quality Inn East at 3525 North Shadeland Avenue in Indianapolis.

As indicated by the public notices, all documents pertinent to AOC 7 were made accessible to the public at the information repository located at the Warren Branch Library, 9701 East 21st Street, Indianapolis, Indiana.

2.4 SCOPE AND ROLE OF ACTION

The sites that required environmental investigations as part of the Remedial Investigation at NAWC Indianapolis comprised eighteen areas of concern and one Installation Restoration (IR) site. This Decision Document addresses the contamination of the soil and groundwater associated with one AOC: AOC 7 – East – West Storm Sewer. This AOC was determined in the RI to be a relatively low risk site within the NAWC Indianapolis facility. The objective of the action described in this decision document is to maintain this low level of risk by controlling the site for non-residential uses. The AOC will be addressed independent of the other AOCs and the IR. The other AOCs will be addressed in other decision documents, and the basewide groundwater conditions will also be evaluated in a separate document.

2.5 SUMMARY OF SITE CHARACTERISTICS

2.5.1 Geology

The geology of AOC 7 is consistent with the geology found across the NAWC facility. The 10 borings drilled at AOCs 5 and 7, ranging in depth from 10 to 14 feet bgs, only partially penetrated through the unconsolidated surficial fill and glacial deposits. At AOC 7, brown topsoil and clayey silt was encountered from ground surface down to 1 foot bgs and yellow brown to gray silty clay was encountered from 1 foot

bgs down to approximately 14 feet bgs. The geology observed in these areas may not be representative of these AOCs since the investigated areas were excavated to place sewers, manholes, and catch basins, and were later backfilled.

2.5.2 Hydrogelogy

No permanent monitoring wells were installed in AOC 7, thus hydraulic gradients, groundwater flow directions or velocity could not be determined at this site. The water table was not encountered within the borehole depths at AOC 7. Groundwater flow in the shallow aquifer is expected to mimic the basewide groundwater flow direction and the relatively flat surface topography and flow to the southeast. It is also believed that groundwater in the shallow aquifer will eventually discharge into Pleasant Run to the southeast.

2.5.3 NATURE AND EXTENT OF CONTAMINATION

This section presents the results of the sampling and analysis of environmental samples collected at AOC 7, the East-West Storm Sewer. The investigation of AOC 7 did not include the collection of groundwater data. All data generated by the fixed-base laboratory were validated according to EPA National and Region V guidelines.

Surface and subsurface soil samples were collected from six direct push soil borings located adjacent to the storm sewer northeast of Building 9500 (Public Works Paint Shop), at the northwest corner of Building 9500, and in the vicinity of a reported drainage field located northwest of Building 9500.

Three volatile organic compounds (VOCs), 4-methyl-2pentanone, carbon disulfide, and toluene were detected at trace concentrations (2 µg/kg) in AOC 7 soils. Numerous metals were detected at each of the six soil sampling locations, generally at concentrations well below the upper tolerance limit of the background samples. The only metal detected at a concentration exceeding both background cocentrations and one or more of the screening criteria was thallium in the surface soil samples from soil boring A05-DP002. The thallium concentration at this location exceeded the criteria for the transfer from soil to groundwater, and marginally exceeded the background concentration. Because there is little evidence of soil contamination at this AOC, and because thallium would have been used at NAWC Indianapolis only in very small quantities relative to other metals and organic solvents, it is unlikely that the measured concentration of thallium are due to the influence of the storm sewer.

Ten polycyclic aromatic hydrocarbons (PAHs) were detected in the sample of sediment from the drainage field. These PAHs were present at concentrations ranging between 78 and 220 µg/kg. Bis(2-ethylhexyl)phthalate and butylbenzyl phthalate were also detected at 430 µg/kg and 54 µg/kg, respectively. PAHs are products of fossil fuel combustion, while phthalates are used in the production of plastics. The presence of these chemicals at the measured concentration is consistent with their location within a storm sewer receiving runoff from roadways, parking lots, and other paved areas.

A sample of material which had sedimented within the piping associated with the drainage field northwest of the Public Works Paint Shop was also collected and analyzed in order to characterize the potential of the East-West Storm sewer to act as a source of contaminants to the surrounding environment. This material is not a soil or true sediment sample. There are no appropriate benchmarks available for comparison to this material. The concentration of semivolatile compounds in this sample are below all the screening criteria for soil. Concentrations of inorganics in this sample are all within the range of NAWC Indianapolis specific background concentrations.

2.6 SUMMARY OF SITE RISKS

During the RI, an analysis was conducted to estimate the health or environmental problems that could result if the soil contamination at AOC 7 was not mitigated. This analysis is commonly referred to as a baseline risk assessment. In conducting this assessment, the focus was on health effects that could result from exposure to the soil and groundwater contaminants in both an industrial and a residential setting. The industrial setting considered the exposure by on-site workers, construction workers and adolescent trespassers. Residential exposure considered on-site exposure to the soil by future use of the site as residential property. At AOC 7, fourteen soil samples were collected from five borings at the AOC, one sediment sample was collected from the drainage filed, and no groundwater samples were collected. In samples collected during the RI, contaminants were detected in the soils and sediment at the AOC.

The concentrations were compared to risk assessment criteria for residential and non-residential use. Criteria that were used to evaluate direct contact exposures were EPA Region III Risk Based Concentrations (RBCs), EPA Region IX Preliminary Remediation Goals (PRGs), IDEM Tier II Goals, and site-specific background concentrations. In addition, EPA Generic Soil Screening levels (SSLs) and IDEM Tier II Goals were used to evaluate the potential for a chemical to migrate from the soil to the groundwater. If a chemical concentration in groundwater or soil was found to be greater than one of the criteria (or 10% of PRG or RBC in the case of non-carcinogens), then the chemical was designated as a

Chemical Of Potential Concern (COPC) and was considered for further risk analysis. Concentrations of inorganic chemicals were also compared to site-specific background concentrations.

Based on the laboratory analyses, the only COPC detected in the soil was thallium (3.3 mg/kg maximum). The only criteria that was exceeded is the EPA Generic Soil Screen Level (SSL). The SSL criteria assumes residential use, and since the future anticipated uses of the site were assumed to be non-residential, the criteria is not applicable and the risk level was not evaluated further. None of the residential and non-residential criteria were exceeded. The most restrictive criteria that were used for determining the COPCs use a risk level of 1.0×10^{-6} in the calculation of the criteria. Thus, it was not necessary to calculate risk levels since the risk of exposure for any residential or non-residential receptor is less than the EPA criteria of 1.0×10^{-6}.

The available data suggested that the chemicals detected in the soil were not migrating off-site, therefore, risks based on off site residential use of the groundwater were not evaluated. There are no on-site wells and the area is serviced by a public water supplier so risks by on-site consumers (present or future) were not evaluated.

The planned future use of the site is industrial, so the risks based on those uses were given more consideration than residential use. Alternatives for addressing the site were based on the continued industrial use of the site.

A baseline ecological risk assessment was also performed. The ecological risk assessment compared soil sample analytical results to Ecological Screening Levels. Ecological Screening Levels are based on EPA Region III Biological Technical Advisory Group (BTAG) values and “B level” criteria developed by The Netherlands and the Province of Quebec. If a chemical concentration in soil was found to be greater than one of the criteria, then the chemical was designated as a COPC and was considered for further risk analysis. COPCs were then used to evaluate the risk to wildlife receptors by calculating hazard quotients using a simple food chain model developed by the EPA Emergency Response Team. Finally, site specific factors were examined to evaluate the likelihood that a COPC may actually pose a risk. Such factors include the COPC concentration relative to the background, frequency and magnitude of detections, relationship of average COPC concentration to screening level, area affected, probable bioavailability, and degree in which wildlife are expected to use the area. In addition to contaminants in the surface soil, contaminants in the groundwater were modeled to predict their concentrations in Pleasant Run. The predicted concentrations were compared to surface water criteria. Contaminants with concentrations

above the surface water criteria were retained as COPCs. Following the evaluation of the above information, COPCs that were judged likely to pose a potential risk under the site conditions were identified as chemicals of concern for further evaluation.

Based on the results of the surface soil analyses, only thallium was identified as a COPC. The hazard quotients calculated by the model show that there is a potential risk to wildlife. The maximum concentration of thallium, 1.4 mg/kg, was similar to the background concentration of 2.71 mg/kg. AOC 7 is located below buildings and in open grassy areas that provide little habitat. Thus, when the site-specific factors are considered, the ecological risks for the site are considered to be minimal. The COPC is not considered to be a chemical of concern, and no further ecological evaluation was made.

The summary of the analytical results and risk assessment tables from the RI report are included in Appendix A. A figure depicting the sample locations is also provided in Appendix A.

2.7 DESCRIPTION OF ALTERNATIVES

The alternatives for AOC 7 are presented below. Note that the RI for NAWC Indianapolis has been completed, but the Feasibility Study has not been developed. These alternatives were presented in the Proposed Plan (TtNUS, 1998). The alternatives that were considered are as follows:

- Alternative 1: No Action
- Alternative 2: Institutional Controls

2.7.1 Alternative 1: No Action

The “No Action” alternative is evaluated at every site to establish a baseline for comparison. Under this alternative, no further action would be taken to prevent exposure to the contamination in the soil.

There are no capital costs, operations and maintenance costs, and present worth is associated with this alternative. There is no implementation time associated with this alternative.

2.7.2 Alternative 2: Institutional Controls

Institutional controls will be put in place to maintain the industrial use of the site. The alternative is consistent with the proposed use the property in the future. The institutional controls consists of deed restrictions that include:

- a clause restricting the land use to non-residential and specifically prohibiting uses such as, but not limited to, day care facilities and facilities for the elderly.

- a clause retaining the rights of access by the Navy, and Federal and State regulators for environmental investigations, inspections and/or remedial actions.

An Institutional Controls Plan (ICP) has been prepared to ensure the long term effectiveness of the institutional controls. The plan was developed according to EPA guidance. This plan includes a description of the areas controlled by the deed restrictions, description of site, identification of residual risk(s) presented, types of ICs imposed, proposed deed language implementing ICs, party responsible for monitoring the integrity and effectiveness of imposed control(s), procedures for reporting and enforcing against IC violations, assurances regarding completion of the CERCLA five-year review process, IC recordation / notice requirements, and commitment to pre-transfer meeting.

Since contamination will remain on site and a remedial action, institutional controls, is implemented, a five-year review of the remedy is required. No routine monitoring is proposed fcr AOC 7 since the groundwater data, as reported in the RI report and Phase II Technical Memorandum, shows that there were no detection of contaminants above screening levels at sampling locations immediately downgradient of AOC 7.

There are no capital costs associated with this alternative although there will be some costs associated with routine administration and the five-year review (presented below). The implementation time to prepare and finalize the deed restriction language is estimated to be two months.

Note that this alternative does not employ any treatment or removal technologies. Human health and the environment is protected by this remedy without the need for further physical changes.

Total Five Year Costs[1]

	Total hours	Labor Costs	Airfare/Lodging per diem/auto costs	AOC 7[2] Costs
Routine Administration	10	$350		
Parcel Transfer				
Trip 1	12	$420	$556	
Trip 2	12	$420	$556	
Five Year Review	12	$420	$556	
Problem Resolution				
Number 1	12	$420		
Number 2	12	$420		
Total		$2,450	$1,668	$412

1 Total five year costs included costs associated with AOC 1, AOC 5, AOC 6, AOC 7, AOC 8, AOC 9, AOC 15, AOC 17, and AOC 18.
2 AOC 7 costs are based as a percentage (10%) of the total five year costs.

2.7.3 Other Alternatives

The current use of the facility and site is industrial. The intended future use of the site is industrial and the intended use of the facility is non-residential. Alternative 2 - Institutional Controls was evaluated and found to be protective of human health and the environment.

As required by the NCP, other alternatives were considered but were determined by the BCT to be not appropriate for the levels of contamination found at the AOC. Since Alternative 2 is protective of human health and the environment, no other alternatives were evaluated in detail. Other alternatives are variations of soil remediation, such as such as excavation and disposal. These alternatives share several general characteristics. All require capital expenditure for field work and disposal. All require an implementation time of six to twelve months for design, bidding, procurement, and site work.

Any of these other alternatives can be expected to be evaluated favorably with the nine criteria. However, the resulting protection of human health and environment is the same as the institutional controls. The costs for implementation of remediation alternatives provide no additional benefit compared to the

institutional controls. Thus, a detailed evaluation of other alternatives was not made and other alternatives were not considered further.

2.8 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The preferred alternative for AOC 7 is Alternative 2 - Institutional Controls. Based on current information, this alternative would appear to provide the best balance of trade-offs among the alternatives with respect to nine criteria that EPA uses to evaluate alternatives. This section profiles the performance of the preferred alternative against the nine criteria, noting how it compares to the other alternatives under consideration. The nine criteria are summarized below.

Overall Protection of Human Health and Environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

Compliance with ARARs addresses whether or not a remedy will meet all of the Applicable or Relevant and Appropriate Requirements of other Federal and State environmental statutes and/or provide grounds for invoking a waiver.

Long-term effectiveness and performance refers to the magnitude of residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies that may be employed in a remedy.

Short-term effectiveness refers to the speed which the remedy achieves protection, as well as the remedy's potential to create adverse impacts on human health and the environment that may result during the construction and implementation period.

Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the chosen solution.

Cost includes capital and operations and maintenance costs.

State Acceptance indicates whether, based on its review of the RI and Proposed Plan, the State concurs with, opposes, or has no comment on the preferred alternative.

Community Acceptance indicates whether interested persons in the community support, have reservations about, or oppose the preferred alternative.

2.8.1 Analysis

Overall Protection of Human Health and Environment. All of the alternatives, except for the "no action" alternative would provide adequate protection of human health and the environment by implementing institutional controls or by removing the contaminants. The preferred alternative would implement institutional controls to minimize contact with the contaminants.

Compliance with ARARs. The preferred alternative is in compliance with Federal and State ARARs.

Long-term effectiveness. The preferred alternative would be effective in the long run since the deed restrictions would be maintained through the implementation of an Institutional Controls Plan.

The "no action" alternative provides no long-term safeguards against exposure. Therefore, the alternative will not be considered further.

Reduction of toxicity, mobility, or volume through treatment. The preferred alternative offers no change in the toxicity, mobility or volume of contaminants.

Short-term effectiveness. The preferred alternative can be instituted in a relatively short time. There is no change in the situation while waiting for implementation.

Implementability. The preferred alternative has few administrative issues that will affect its implementation. Deed restrictions have been used in the past at other facilities.

Cost. The preferred alternative has no capital cost and no annual operations and maintenance costs. The costs associated with the five year review.

State Acceptance. The preferred alternative is in compliance with States ARARs. The State has viewed the preferred alternative favorably.

Community Acceptance is described in Section 3.0 Responsiveness Summary.

2.9 SELECTED REMEDY

The selected remedy will provide a satisfactory level of risk relative to the current and future intended uses of the site. The level of risk is maintained but with little expenditure. The selected remedy is believed to provide the best balance in trade-offs among the alternatives with respect to the evaluation criteria. The selected remedy, however, does not result in unrestricted use of the site and five-year review of the site will be required.

Alternatives that employ treatment or removal were not considered practical since the risk associated with the site is consistent with the intended future uses of the facility.

2.10 STATUTORY DETERMINATION

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practical for this site. However, because treatment of the principal threats of the site was not found to be practical, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The size, location, and amount of contamination found at AOC 7 precludes a remedy in which contaminants would be treated effectively.

Because this remedy will result in the contamination remaining on-site, the Navy will conduct a review every five years after the commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

3.0 RESPONSIVENESS SUMMARY

A Proposed Plan for AOC 7 was issued in September 1998. Subsequent to this, the Navy solicited input from the community on the selected alternative. The Navy set a public comment period from September 28, 1998 to October 27, 1998, which was later extended to November 11, 1998, to encourage public participation in the selection process. The comment period included a public meeting at which the Navy, with the EPA and IDEM, will presented the Proposed Plan, answered questions, and accepted both oral and written comments. The public meeting was held on October 14, 1998 from 7:00 PM to 9:00 PM at the Quality Inn East at 3525 North Shadeland Avenue in Indianapolis. As indicated by the public notice for the meeting, all documents pertinent to AOC 7 were made available to the public at the information repository located at the Warren Branch Library, 9701 East 21st Street, Indianapolis, Indiana.

3.1 COMMUNITY PREFERENCES

Comments were received from one person. The comments concurred with the deed restrictions to limit the land use to industrial but expressed concern for the land use to be changed to residential or permit day care facilities without extensive investigation. The comments were general and did not specify an AOC.

3.2 INTEGRATION OF COMMENTS

As these comments concurred with the selected remedies identified, integration of the comments was not warranted.

3.3 COMMENT RESOLUTION

Please refer to the following pages for USEPA and IDEM comments and resolutions. Note that ‘Draft’ comments were addressed in working meetings, by teleconference or in revised documents. A formal written response was not provided for these comments.

RECORD OF USEPA AND IDEM
COMMENTS AND RESOLUTIONS

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live

Frank O'Bannon
Governor

John M. Hamilton
Commissioner

100 North Senate Avenue
P.O. Box 6015
Indianapolis, Indiana 46206-6015
(317) 232-8603
(800) 451-6027
www.ai.org/idem

November 17, 1998

Mr. Carl Loop
SOUTHDIV NAVFACENGCOM
2155 Eagle Drive
North Charleston, SC 29419-9010

Dear Mr. Loop:

Re: IDEM staff comments regarding the Proposed Plans (PPs) for AOCs 1, 5, 6, 7, 8, 9, 15, 17, and 18

Staff of the Indiana Department of Environmental Management have reviewed the above referenced documents. Our review generated the following comments:

GENERAL COMMENTS:

Section 7.0 - Community Participation:
In paragraph 2, the third sentence should read: "The Proposed Plan meets the applicable or relevant and appropriate federal and state requirements." In addition, this section should explain how public comments will be addressed. Please verify if a copy of the administrative record is available at the Warren Branch Library. If this is not the case, delete the statement in the last paragraph of this section.

SPECIFIC COMMENTS:

AOC 5:

Section 2.2 - Site History:
The entire sanitary sewer line will be transferred. However, the sewer lines, and the land around the sewer lines (easement), is transferable if the sewer line is within the transfer parcel 1. Clarification in the text is needed.

Figure 2-2:
The hatched areas on the map represent the transferable soils around some parts of the sewer system. However, the legend on the figure does not reflect that. A statement explaining that fact is needed in the text of the PP.

AOC 7:

Section 2.2 - Site History:
The entire sanitary sewer line will be transferred. However, the sewer lines, and the land around the sewer lines (easement) is transferable if the sewer line is within the transfer parcel 1. Clarification in the text is needed.

Figure 2-2:
The hatched areas on the map represent the transferable soils around some parts of the sewer system. However, the legend on the figure does not reflect that. A statement explaining that fact is needed in the text of the PP.

CONCLUSION:

It is IDEM staffs understanding that Institutional Control Plans (ICPs) will be attached to the Proposed Plans/Decision Documents. Once these ICPs are approved by IDEM and the U.S. EPA, IDEM staff will issue concurrence with the subject PPs. If you have any questions regarding the above comments, please contact me at (317) 308-3133.

Sincerely,

Gabriele Hauer, Project Manager
Defense Environmental Restoration Prograrn
Office of Environmental Response

GHH:mg
cc: Rex Osborn, DERP, IDEM
Denise Boone, U.S. EPA Region V
Mark Sladic, Tetra Tech NUS
Joe Logan, Tetra Tech NUS
Alan Shoultz, Navy-Southdiv.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

SRF-5J

December 1, 1998

Carl Loop
Department of the Navy
SOUTHDIV NAVFACENGCOM
Code 18E2BM
2155 Eagle Drive
Post Office Box 190010
North Charleston, SC 29419-9010

RE: Proposed Plans for Areas of Concern 1, 5, 6, 7, 8, 9, 15, 17 and 18 for the Naval Air Warfare Center, Indianapolis, Indiana.

Dear Mr. Loop:

The United States Environmental Protection Agency (USEPA) has reviewed the Proposed Plans for Areas of Concern (AOCs) 1, 5, 6, 7, 8, 9, 15, 17 and 18 for the Naval Air Warfare Center (NAWC), Indianapolis, Indiana. The preferred alternatives that the Navy has chosen for each of the AOCs are acceptable. However, the Navy must realize that there are costs associated with institutional controls (ICs) that are deed restrictions. The Navy must include an estimate of the costs for ICs.

The USEPA will not concur until the following are complete: the community acceptance of the preferred alternative, the Institutional Control Plan(s), and the finalized decision documents.

If the Navy as the lead agency reevaluates their preferred alternative for the AOCs, changes a component of the preferred remedy, or chooses to implement a remedy other than the preferred alternative, any such changes must be made in accordance with CERCLA Section 117(b).

If you have any questions concerning this letter, please feel free to contact me at (312) 886-6217.

Sincerely,

Denise Boone

Denise Boone
Remedial Project Manager

cc: Gabriele Hauer, IDEM

TETRA TECH NUS, INC.
661 Andersen Drive ▪ Pittsburgh, Pennsylvania 15220-2745
(412) 921-7090 ▪ FAX (412) 921-4040 ▪ www.tetratech.com

PITT 03-9-043

March 5, 1999

Project Number 7173

Department of the Navy
SOUTHNAVFACENGCOM
ATTN: Carl Loop (Code 1871)
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: CLEAN Contract Number N62467-94-D-0888
Contract Task Order 0012

Subject: Decision Documents for AOC 1
Naval Air Warfare Center Indianapolis

Dear Mr. Loop:

In accordance with your request, please find enclosed three copies of the finalized Decision Document for AOC 1. The second part of the AOC 1 Decision Document submittal is the Institutional Control Manual and ICP for AOC 1. We believe the ICM is compliant with the most recent information provided by U.S. EPA. Upon regulatory concurrence, it is the Navy's intent to proceed as quickly as possible to complete the Decision Documents for the other AOCs in Parcel 1. These include AOCs 5, 6, 7, 8, 9, 15, 17, and 18.

Additionally, please see responses to IDEM comments. EPA said in a December 1, 1998 letter that they would not provide comments prior to community acceptance, completion of an ICP and finalized DD. The Navy feels these conditions have now all been met.

If you have any questions, feel free to call me at (412) 921-8216.

Sincerely,

Mark Sladic, P.E.
Task Order Manager

MS/gp

Enclosures

cc: Gabriele Hauer, IDEM
Denise Boone, USEPA
Alan Shoultz (w/o enclosures)
File 7173

IDEM COMMENTS REGARDING PROPOSED PLANS (PPs) FOR AOCs 1,5,6,7,8, 9, 15, 17, and 18

GENERAL COMMENTS:

1. **COMMENT:** **Section 7.0 – Community Participation**: In paragraph 2, the third sentence should read: "The Proposed Plan meets the applicable or relevant and appropriate federal and state requirements." In addition, this section should explain how public comments will be addressed. Please verify if a copy of the administrative record is available at the Warren Branch Library. If this is not the case, delete the statement in the last paragraph of this section.

   RESPONSE

a. The Navy agrees. This sentence in question some how got truncated and was missed. This will be corrected in the Decision Document.

b. A paragraph stating how the public comments will be addressed is located at the top of page 7-2. This is compliant with the EPA ROD guidance. No changes to the text are necessary.

c. A copy of the Administrative Record is located in the Warren Branch Library.

SPECIFIC COMMENTS:

AOC5:

1. **COMMENT:** **Section 2.2 – Site History:** The entire sanitary sewer line will be transferred. However, the sewer lines, and the land around the sewer lines (easement), is transferable if the sewer line is within the transfer parcel 1. Clarification in the text is needed.

   RESPONSE: The Navy agrees. This paragraph will be re-written to clarify this issue in the Decision Document.

2. **COMMENT Figure 2.2.** The hatched areas on the map represent the transferable soils around some parts of the sewer system. However, the legend on the figure does not reflect that. A statement explaining that fact is needed in the text of the PP.

   RESPONSE: The Navy agrees. A statement will be added to the text to explain the hatched areas on Figure 2-2. This change will be reflected in the Decision Document.

AOC 7:

1. **COMMENT:** **Section 2.2 – Site History:** The entire sanitary sewer line will be transferred. However, the sewer lines and the land around the sewer lines (easement) is transferable if the sewer line is within the transfer parcel 1. Clarification in the text is needed.

   RESPONSE: The Navy Agrees. This paragraph will be re-written to clarify this issue in the Decision Document.

2. **COMMENT:** **Figure 2-2:** The hatched areas on the map represent the transferable soils around some parts of the sewer system. However, the legend on the figure does not reflect that. A statement explaining that fact is needed in the text of the PP.

   RESPONSE: The Navy agrees. A statement will be added to the text to explain the hatched areas on Figure 2-2. This change will be reflected in the Decision Document.

TETRA TECH NUS, INC.
661 Andersen Drive ▪ Pittsburgh, Pennsylvania 15220-2745
(412) 921-7090 ▪ FAX (412) 921-4040 ▪ www.tetratech.com

PITT 08-9-050

August 6, 1999

Project Number 7173

Department of the Navy
SOUTHNAVFACENGCOM
ATTN: Carl Loop (Code 1871)
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: CLEAN Contract Number N62467-94-D-0888
Contract Task Order 0012

Subject: Decision Documents for Parcel 1
Naval Air Warfare Center Indianapolis

Dear Mr. Loop:

Please find enclosed three copies of change pages for the Parcel 1 AOCs.

1. **Instructions for the material attached to this letter**: Pursuant to their letter dated July 28, regarding the Decision Documents for this site, the EPA has requested that a copy of the USEPA's and the Indiana Department of Environmental Management's. (IDEM) comments on the proposed plan/DD and the Navy's responses to the comments be included with these documents. Therefore, please replace the following pages:

    - The updated table of contents (identifying Section 3.3 Comment Resolution), and,
    - Page 3-1

    Following Page 3-1, please insert the pages following the title page 'USEPA and IDEM Comments and Resolutions.' Note that the content of each group is identical, however the contents page and page 3-1 contain a header in the upper right corner which indicate which section the change pages should be inserted in.

    As the remedy for AOC 6 and AOC 8 are 'no further action', these AOCs do not have change pages. This is consistent with EPA's July 28 letter.

2. **Schedule**: The Navy believes that the absence of these comment letters has not presented a material hurdle to completion of the regulatory review for these documents. The team schedule specified that following a 30-day regulatory review period, the date of concurrence on the Decision Documents was to be August 5. The Navy would appreciate if the EPA can now remove the signature pages from one set of the Decision Documents and sign these in the appropriate locations. Afterwards, please forward

these to the IDEM for signature. Following IDEM signature, the Navy requests that IDEM please forward them to Southdiv, attention Carl Loop, for final signature. When Southdiv returns the signed pages to us, we will provide copies for inclusion in all outstanding sets of Decision Documents.

If you have any questions, feel free to call me at (412) 921-8216.

Sincerely,

Mark Sladic, P.E:
Task Order Manager

MS/kf

Enclosures

cc: Sean Grady, IDEM (w/enclosure)
Gary Schafer, USEPA (w/enclosure)
Alan Shoultz (w/o enclosures)
Mark Perry, TtNUS (w/enclosure)
Debra Wroblewski/DER, TtNUS (w/o enclosures)

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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August 17, 1999

Mr. Carl Loop
Department of the Navy
SOUTHDIV NAVFACENGCOM
Code 18E2BM
2155 Eagle Drive
Post Office Box 190010
North Charleston, SC 29419-9010

Dear Mr. Loop:

Re: Decision Document for Areas of Concern #5, 6, 7, 8, 9, 15, 17, and 18 for the Naval Air Warfare Center, Indianapolis, Indiana

Staff of the Indiana Department of Environmental Management (IDEM) have reviewed the above referenced document and has determined that it is acceptable providing the Navy address the following comments:

GENERAL COMMENT

An executive summary should be incorporated to give the readers an understanding of what this document is and why it was developed. Also, the title of this report should be changed to more accurately reflect the parcel name.

SPECIFIC COMMENTS

AOC 6, Page 2-13, Section 2.9: Some language in this section is not needed. Since there was no contamination, no risk, and no action is required for this AOC, the second sentence in the first paragraph continuing through the end of the page should be removed. Revision of this section may be needed.

AOC 8, Page 2-13, Section 2.9: Again, some language in this section is not needed. Since there was no contamination, no risk, and no action is required for this AOC, the third sentence in the first paragraph continuing through the end of the page should be removed. Revision of this section may be needed.

If you have any questions concerning this letter, please feel free to contact me at (317) 308-3121.

Sincerely,

Sean K. Grady, Project Manager
Federal Programs Section
Office of Environmental Response

SKG:mg
cc: Alan Shoultz, SOUTHDIV
Mark Sladic, Tetra Tech NUS
Denise Boone, U.S. EPA

REFERENCES

B&R Environmental, March 1996, Environmental Baseline Survey - Naval Air Warfare Center Indianapolis, Indiana.

B&R Environmental, June 1996. Community Relations Plan - Naval Air Warfare Center Indianapolis, Indiana.

B&R Environmental, August 1996. Finding of Suitability to Lease and Environmental Baseline Survey for Lease - Naval Air Warfare Center Indianapolis, Indiana.

B&R Environmental, October 1996. Remedial Investigation Work Plan - Naval Air Warfare Center Indianapolis, Indiana.

Supporting documents: Field Sampling Plan
Health and Safety Plan
Quality Assurance Project Plan

B&R Environmental, November 1996. DRAFT Data Management Plan - Naval Air Warfare Center Indianapolis, Indiana.

B&R Environmental, November 1997. Phase I Remedial Investigation Report - Revision 1 - Naval Air Warfare Center Indianapolis, Indiana

IDEM (Indiana Department of Environmental Management), October 1995. Voluntary Remediation Program Resource Guide. Office of Environmental Response.

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Tetra Tech NUS, Inc., September 1998, Proposed Plan for AOC 7 - East-West Storm Sewer - Naval Air Warfare Center Indianapolis, Indiana.

Tetra Tech NUS, Inc., November 1998, Phase I and II Remedial Investigation Report - Revision 2 - Naval Air Warfare Center Indianapolis, Indiana.

U.S. EPA (United States Environmental Protection Agency), 1989. Guidance on Preparing Superfund Decision Documents - Interim Final. EPA/540/G-89/007. Office of Emergency and Remedial Response, Washington, DC.

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U.S. Geological Survey, 1997, Hydrogeology and Ground-Water Flow in the Vicinity of the Naval Air Warfare Center, Indianapolis, Indiana., Risch M. R. and R. F. Duwelius, U.S. Department of the Interior, U.S. Geological Survey, Indianapolis, Indiana, Final Report.

U.S. Geological Survey, 1998, Hydrogeology, Ground-Water Quality, Ground-Water flow a the Naval Air Warfare Center, Indianapolis, Indiana., Risch, M. R., U.S. Department of the Interior, U.S. Geological Survey, Indianapolis, Indiana, Draft Report.

AOC 7

APPENDIX A

REMEDIAL INVESTIGATION REPORT LABORATORY DATA, RISK ASSESSMENT TABLES AND SAMPLE LOCATION FIGURE

TABLE 10-5
SUMMARY OF POSITIVE DETECTIONS IN SURFACE AND SUBSURFACE SOIL
AOC 7 - EAST-WEST STORM SEWER
NAVAL AIR WAREFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER:	BACKGROUND	A05DP00201	A05DP00202	A05DP00203	A07DP00101	A07DP00102	A07DP00103	A07DP00201	A07DP00202	A07DP00203
SAMPLE DATE:		11/12/96	11/12/96	11/12/96	11/12/96	11/12/96	11/12/96	11/12/96	11/12/96	11/12/96
PHASE:		I	I	I	I	I	I	I	I	I
BORING:		AOC05DP02	AOC05DP02	AOC05DP02	AOC07DP01	AOC07DP01	AOC07DP01	AOC07DP02	AOC07DP02	AOC07DP02
AOC:		A07	A07	A07	A07	A07	A07	A07	A07	A07
DEPTH:		0 - 2	2 - 6	6 - 10	0 - 2	2 - 6	6 - 10	0 - 2	2 - 6	6 - 10
FIELD DUPLICATE OF:										
VOLATILES (ug/kg)										
4-METHYL-2-PENTANONE		12 U	11 U	11 U	12 UJ	11 UJ	11 UJ	11 UJ	11 U	11 UJ
CARBON DISULFIDE		12 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	2 J
TOLUENE		12 U	11 U	11 U	12 UJ	11 U	11 UJ	11 U	11 U	11 UJ
METALS (mg/kg)										
ALUMINUM	22217	13600 J	5030 J	5350 J	6520 J	5840 J	4970 J	9830 J	5520 J	5440 J
ANTIMONY	NA	0.81 J*	0.56 J*	0.42 UJ	0.44 J*	0.43 UJ	0.63 J*	0.52 J*	0.45 J*	0.47 J*
ARSENIC	21.3	14.9	5.8 J	6.4 J	6.8 J	6.6 J	5.5 J	5.7 J	6 J	3.7 J
BARIUM	222	113 J	36.2 J	49.1 J	68.5 J	43.3 J	35.4 J	67.5 J	56.2 J	33.8 J
BERYLLIUM	1.13	0.74	0.18 U	0.21 U	0.27	0.22 U	0.19	0.42	0.2	0.2 U
CADMIUM	NA	0.91 J*	0.85 J*	0.91 J*	0.76 J*	0.65 UJ	0.55 UJ	0.63 UJ	0.53 UJ	0.6 UJ
CALCIUM	914377	3570 J	106000 J	88800 J	76900 J	122000 J	98100 J	9160 J	86400 J	120000 J
CHROMIUM	27.1	21.2 J	9.2 U	11.7 J	14 J	11.2 J	7.7 U	15.4 J	10.1 U	9.1 U
COBALT	22.5	9.4 J	5.6 J	4.8 J	7.5 J	6.1 J	4.1 J	4.5 J	5.8 J	4.4 J
COPPER	30.3	19 J	15.7 J	16.4 J	18.9 J	16.5 J	13.5 J	13.6 J	16.6 J	14.7 J
IRON	30170	29000 J	12000 J	13700 J	14100 J	14600 J	11800 J	14200 J	13000 J	11300 J
LEAD	61.7	17.7 J	6.3 J	7.2 J	17.9 J	12.1 J	6.2 J	16.7 J	6.7 J	5.2 J
MAGNESIUM	157362	3360 J	33700 J	29700 J	26800 J	31300 J	26200 J	4580 J	27200 J	38200 J
MANGANESE	2130	283 J	319 J	298 J	430 J	377 J	309 J	289 J	288 J	478 J
NICKEL	108	22.7	18.1	18.8	18.9	14.7	15.7	12.5	19.2	13.2
POTASSIUM	1832	1260	903	1150	921	1250	1030	861	1070	1380
SODIUM	120	798 J*	132 J*	145 J*	117 J	138 J*	122 J*	54.8 U	154 J*	148 J*
THALLIUM	2.71	3.3 *	0.73	1.2	1.2	1.1	1.1	1.4	0.84	0.4 U
VANADIUM	51.3	36.1	14.4	17.4	17.1	18.3	14.1	22.4	14.9	16.5
ZINC	113	83.5	44.8	50.6	60.5	51.9	44.5	58.2	48.9	46.9

Background value for inorganics are the 95% Upper Tolerance Limit (UTL) which is based on the background data set.
*** - Indicates the concentration exceeds background.**
Blank space indicates sample not analyzed for that particular compound.

TABLE 10-5
SUMMARY OF POSITIVE DETECTIONS IN SURFACE AND SUBSURFACE SOIL
AOC 7 - EAST-WEST STORM SEWER
NAVAL AIR WAREFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER:	BACKGROUND	A07DP00203-D	A07DP00301	A07DP00302	A07DP00303	A07DP00401	A07DP00403	A07DP00403-D	A07DP00501	A07DP00502
SAMPLE DATE:		11/12/96	11/12/96	11/12/96	11/12/96	11/12/96	11/12/96	11/12/96	11/12/96	11/12/96
PHASE:		I	I	I	I	I	I	I	I	I
BORING:		AOC07DP02	AOC07DP03	AOC07DP03	AOC07DP03	AOC07DP04	AOC07DP04	AOC07DP04	AOC07DP05	AOC07DP05
AOC:		A07	A07	A07	A07	A07	A07	A07	A07	A07
DEPTH:		6 - 10	0 - 2	2 - 6	6 - 10	0 - 2	6 - 10	6 - 10	0 - 2	2 - 6
FIELD DUPLICATE OF:		A07DP00203						A07DP00403		
VOLATILES (ug/kg)										
4-METHYL-2-PENTANONE		11 UJ	11 UJ	11 UJ	2 J	10 UJ	11 UJ	11 UJ	12 U	11 U
CARBON DISULFIDE		11 UJ	11 U	11 UJ	11 U	10 U	11 U	11 U	12 U	11 U
TOLUENE		11 UJ	11 UJ	11 U	11 U	2 J	11 UJ	11 UJ	12 U	11 U
METALS (mg/kg)										
ALUMINUM	22217	5700 J	5320 J	8280 J	3790 J	2360 J	7890 J	4100 J	7790 J	6520 J
ANTIMONY	NA	0.38 UJ	0.38 UJ	10.6 U	9.9 U	10.6 U	9.5 U	10.6 U	10.6 U	9.7 U
ARSENIC	21.3	4.4 J	6.7 J	6.2	5.5	2.7	5.6	5.4	5.7	5.1
BARIUM	222	32.3 J	33.2 J	61.1 J	41.6 J	15.9 J	61.7 J	47.9 J	56.2 J	42.4 J
BERYLLIUM	1.13	0.19 U	0.21	0.33	0.2	0.2 U	0.32	0.24	0.31	0.28
CADMIUM	NA	0.57 UJ	0.57 UJ	0.61 U	0.96 *	0.61 U	0.68 *	1.1 *	0.61 U	0.56 U
CALCIUM	914377	104000 J	100000 J	97100 J	89500 J	142000 J	106000 J	101000 J	99700 J	83400 J
CHROMIUM	27.1	10.6 U	10.7 U	12.4 J	5.9 J	5.6 J	11.7 J	8.4 J	11 J	13.9 J
COBALT	22.5	6.3 J	5.4 J	7.7 J	4.9 J	2.4 U	6.7 J	6.9 J	5.1 J	6.2 J
COPPER	30.3	16.4 J	16.7 J	17.8	14.3	8.4 J	16.5	16.4	15.5	13.1
IRON	30170	11600 J	13600 J	13200 J	13600 J	7190 J	12500 J	14900 J	12200 J	15100 J
LEAD	61.7	6.9 J	7.2 J	4 J	4.3 J	2.5 J	3.3 J	3.9 J	3.9 J	4 J
MAGNESIUM	157362	34100 J	28300 J	31500 J	27700 J	52300 J	30000 J	29400 J	31000 J	29500 J
MANGANESE	2130	293 J	422 J	404 J	227 J	268 J	293 J	363 J	275 J	317 J
NICKEL	108	18.9	16.3	20.3 J	14.7 J	8 U	19.8 J	19.5 J	16.7 J	20.1 J
POTASSIUM	1832	1340	891	2440 J*	702 U	369 J	2630 J*	762 J	2460 J*	1790 J
SODIUM	120	141 J*	125 J*	249 J*	108 U	207 J*	433 J*	236 J*	258 J*	209 *
THALLIUM	2.71	0.97	0.96	1.2 UJ	1.1 UJ	1.2 UJ	1.1 UJ	1.2 UJ	1.2 UJ	1.1 UJ
VANADIUM	51.3	17.1	15.1	21.5 J	11.9 J	11.1 J	21.2 J	12 J	20.3 J	19.3 J
ZINC	113	50.1	51.3	51.2 J	41.7 J	19.3 J	52.1 J	46.5 J	48.1 J	39 J

Background value for inorganics are the 95% Upper Tolerance Limit (UTL) which is based on the background data set.
*** - Indicates the concentration exceeds background.**
Blank space indicates sample not analyzed for that particular compound.

TABLE 10-5
SUMMARY OF POSITIVE DETECTIONS IN SURFACE AND SUBSURFACE SOIL
AOC 7 - EAST-WEST STORM SEWER
NAVAL AIR WAREFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER:	BACKGROUND	A07DP00503								
SAMPLE DATE:		11/12/96								
PHASE:		I								
BORING:		AOC07DP05								
AOC:		A07								
DEPTH:		6 - 10								
FIELD DUPLICATE OF:										
VOLATILES (ug/kg)										
4-METHYL-2-PENTANONE		12 UJ								
CARBON DISULFIDE		12 U								
TOLUENE		12 UJ								
METALS (mg/kg)										
ALUMINUM	22217	9060 J								
ANTIMONY	NA	11.1 U								
ARSENIC	21.3	7								
BARIUM	222	70.1 J								
BERYLLIUM	1.13	0.44								
CADMIUM	NA	0.64 U								
CALCIUM	914377	52300 J								
CHROMIUM	27.1	13.7 J								
COBALT	22.5	8.6 J								
COPPER	30.3	19.3								
IRON	30170	14700 J								
LEAD	61.7	11.1 J								
MAGNESIUM	157362	14500 J								
MANGANESE	2130	381 J								
NICKEL	108	21.9 J								
POTASSIUM	1832	845 J								
SODIUM	120	94.3 U								
THALLIUM	2.71	1.3 UJ								
VANADIUM	51.3	22.1 J								
ZINC	113	64.2 J								

Background value for inorganics are the 95% Upper Tolerance Limit (UTL) which is based on the background data set.
*** - Indicates the concentration exceeds background.**
Blank space indicates sample not analyzed for that particular compound.

TABLE 10-4C
SUMMARY OF POSITIVE DETECTIONS IN SEDIMENTS
AOC 7 - THE EAST-WEST STORM SEWER
PHASE I REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER: SAMPLE DATE: BORING: AOC: DEPTH: FIELD DUPLICATE OF:	A07SD00101 12/03/96 AOC07SD01 A07 -	/ / -	/ / -	/ / -	/ / -	/ / -	BACKGROUND(1)
SEMIVOLATILES (µg/kg)							
BENZO(A)ANTHYRACEN	140 J						380
BENZO(A)PYRENE	110 J						310
BENZO(B)FLUORANTHENE	220 J						460
BENZO(G,H,I)PERYLENE	110 J						200
BENZO(K)FLUORANTHENE	78 J						190
BIS(2-ETHYLHEXYL)PHTHALATE	430 J						1100
BUTYLBENZYL PHTHALATE	54 J *						ND
CHRYSENE	160 J						360
FLUORANTHENE	320 J						960
INDENO(1,2,3-CD)PYRENE	95 J						180
PHENANTHRENE	170 J						750
PYRENE	270 J						660
METALS (mg/kg)							
ALUMINUM	8960 J						22217
ARSENIC	6.1 J						21.3
BARIUM	59.5 J						222
BERYLLIUM	0.62						1.13
CALCIUM	78000 J						914377
CHROMIUM	15 J						27.1
COBALT	6.4 J						22.5
COPPER	14.3 J						30.3
IRON	13400 J						30170
LEAD	14.4						61.7
MAGNESIUM	11900 J						157362
MANGANESE	462 J						2130

(1) Background values presented for organics are the maximum detected results in the background soil data set.
Background values presented for inorganics are the 95% Upper Tolerance Limits (UTL) which are based on the background soil data set.
ND indicates that the parameter was analyzed but not detected.
*** -indicates the concentration displayed exceeds background.**
Blank space indicates sample not analyzed for that particular compound.

TABLE 10-4C
SUMMARY OF POSITIVE DETECTIONS IN SEDIMENTS
AOC 7 - THE EAST-WEST STORM SEWER
PHASE I REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

SAMPLE NUMBER: SAMPLE DATE: BORING: AOC: DEPTH: FIELD DUPUCATE OF:	A07SD00101 12/03/96 AOC07SD01 A07 -	/ / -	/ / -	/ / -	/ / -	/ / -	BACKGROUND(1)
METALS (mg/kg)							
MERCURY	0.12						0.194
POTASSIUM	1240 J						1832
VANADIUM	22.7 J						51.3
ZINC	54.2 J						113

(1) Background values presented for organics are the maximum detected results in the background soil data set.
Background values presented for inorganics are the 95% Upper Tolerance Limits (UTL) which are based on the background soil data set.
ND indicates that the parameter was analyzed but not detected.
*** -indicates the concentration displayed exceeds background.**
Blank space indicates sample not analyzed for that particular compound.

Data validation was conducted in accordance with the EPA National Functional Guidelines for Organic and Inorganic Data Review and EPA Region V guidelines. The following data qualifiers were used during the data review process:

- U - Indicates that the analyte was not detected at the numerical detection limit. Nondetected results reported by the laboratory and positive results qualified due to laboratory or field blank contamination (false positives) are reported using this qualifier.

- BU - Indicates that the analyte was detected in the associated method blank but the result is considered to be a false positive as a result of method blank contamination.

- BJ - Indicates that the analyte was detected in the associated laboratory method blank. The stated result is qualified as estimated since the concentration exceeds the validation blank action level.

- UJ - Indicates that the analyte was not detected. However, the detection limit is estimated as a result of a noncompliance encountered during laboratory analysis. The associated detection limit is regarded as imprecise.

- J - Indicates that the analyte was detected and the associated numerical result is estimated or imprecise.

- UR - Indicates that the laboratory did not detect the analyte. However, the nondetected analyte is considered unreliable and unusable as a result of a gross technical deficiency.

- R - Indicates that the laboratory detected the analyte. However, the positive result is considered unreliable and unusable as a result of a gross technical deficiency.

The above qualifications are generally categorized as major and minor problems or deficiencies. Major problems are defined as those, which result in the rejection of a data. Such results are qualified either as R or UR. Minor problems are defined as those, which result in the estimation of a given data point. The following qualifiers identify data qualified as a consequence of minor problems: BU, BJ, UJ, and J.

TABLE 10-13

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
DIRECT CONTACT EXPOSURE - RESIDENTIAL LAND USE SCENARIO
AOC 7 - EAST-WEST STORM SEWER - SURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

Chemical	Frequency of Detection (1)	Range of Detection	Exposure Point Concentration	Average Concentrations Positive Hits	Location of Maximum	EPA Region III Risk-Based Concentrations (2) Residential	EPA Region IX Preliminary Risk-Based Goals (3) Residential	Indiana Tier II Cleanup Goals (4) Residential	Soil Screening Level (5) Soil to Air	Upper Tolerance Limit for Background	Selected as a COPC? Residential Yes or No	Rationale for Contaminant Deletion or Selection (6)
Volatile Organic Compounds (ug/kg)												
TOLUENE	1/8	2		2	A07DP00401	1600000	520000	1000000	650000	ND	No	BSL
Metals (mg/kg)												
ALUMINUM	8/8	2360 - 13600		7570	A05DP00201	[redacted]	[redacted]	—	—	22217	No	BKG
ANTIMONY	3/8	0.44 - 0.81		0.59	A05DP00201	3.1	3	100	—	[redacted]	No	BSL
ARSENIC	8/8	2.7 - 14.8		7.08	A05DP00201	[redacted]	[redacted]	91	750	21.3	No	BKG
BARIUM	8/8	15.9 - 113		59.1	A05DP00201	550	520	10000	660000	223	No	BKG, BSL
BERYLLIUM	5/8	0.21 - 0.74		0.39	A05DP00201	15	[redacted]	[redacted]	1300	1.13	No	BKG
CADMIUM	2/8	0.76 - 0.91		0.835	A05DP00201	3.9	3.7	135	1800	[redacted]	No	BSL
CALCIUM	8/8	3670 - 143000		71868	A07DP00401	—	—	—	—	914377	No	BKG, NUT
CHROMIUM	5/8	6.6 - 21.2		13.4	A05DP00201	12000 (7)	—	10000	—	27.1	No	BKG, BSL
COBALT	5/8	4.6 - 8.4		6.36	A05DP00201	470	350	—	—	22.6	No	BKG, BSL
COPPER	8/8	8.4 - 19		13.4	A05DP00201	310	280	—	—	30.3	No	BKG, BSL
IRON	8/8	7160 - 25800		15048	A05DP00201	[redacted]	[redacted]	—	—	30173	No	BKG, NUT
LEAD	8/8	2.5 - 17.9		11.0	A07DP00101	400 (8)	400	—	—	61.7	No	BKG, BSL
MAGNESIUM	8/8	3360 - 52600		24396	A07DP00401	—	—	—	—	157392	No	BKG, NUT
MANGANESE	8/8	266 - 430		328	A07DP00101	[redacted]	[redacted]	—	—	2130	No	BKG
NICKEL	5/8	12.6 - 22.7		17.4	A05DP00201	160	150	5400	13000	109	No	BKG, BSL
POTASSIUM	8/8	368 - 2400		1127	A07DP00501	—	—	—	—	[redacted]	No	NUT
SODIUM	8/8	117 - 788		301	A05DP00201	—	—	—	—	[redacted]	No	NUT
THALLIUM	4/8	0.98 - 3.3		1.72	A05DP00201	[redacted]	[redacted]	—	—	120	No	BKG
VANADIUM	5/8	11.1 - 36.1		20.4	A05DP00201	55	52	1680	—	61.3	No	BKG, BSL
ZINC	8/8	19.3 - 63.8		53	A05DP00201	2300	2300	10000	—	113	No	BKG, BSL

Notes:
1 - Data from the following sampling locations were included in the screening process: A05DP00201, A07DP00101, A07DP00201, A07DP00301, A07DP00401, A07DP00501
2 - U.S. EPA Region III Risk-based Concentration Table, April 12, 1999.
3 - U.S. EPA Region IX Preliminary Remedial Goals, May 1, 1998.
4 - IDEM Voluntary Remediation Program Resource Guide, October, 1995.
5 - U.S. EPA Soil Screening Guidance, May 1996.
6 - Rationale Codes Above Screening Levels (ASL)
Background Levels (BKG)
Essential Nutrient (NUT)
Below Screening Level (BSL)
7 - Value is for trivalent chromium.
8 - OSWER screening level.
One-tenth the EPA Region III RBCs and EPA Region IX PRGs are presented for noncarcinogenic compounds.
Shaded bolded values indicate an exceedance of background and / or criteria.
ND - Not Detected
COPC - Chemicals of Potential Concern.

TABLE 10-14

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
DIRECT CONTACT EXPOSURE - NONRESIDENTIAL LAND USE SCENARIO
AOC 7 - EAST-WEST STORM SEWER - SURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

Chemical	Frequency of Detection (1)	Range of Detection	Exposure Point Concentration	Average Concentrations Positive Hits	Location of Maximum	EPA Region III Risk-Based Concentrations (2) Non-Residential	EPA Region IX Preliminary Risk-Based Goals (3) Non-Residential	Indiana Tier II Cleanup Goals (4) Non Residential	Soil Screening Level (5) Soil to Air	Upper Tolerance Limit for Background	Selected as a COPC? Non-Residential Yes or No	Rationale for Contaminant Deletion or Selection (6)
Volatile Organic Compounds (ug/kg)												
TOLUENE	1/6	2		2	A07DP00401	41000000	520000	1600000	650000	ND	No	BSL
Metals (mg/kg)												
ALUMINUM	6/6	2380 - 13900		7570	A05DP00201	200000	100000	--	--	23217	No	BKG, BSL
ANTIMONY	3/6	0.44 - 0.81		0.59	A05DP00201	82	75	816	--	[redacted]	No	BSL
ARSENIC	6/6	2.7 - 14.8		7.06	A05DP00201	[redacted]		412	750	21.2	No	BKG
BARIUM	6/6	18.6 - 413		68.1	A05DP00201	14000	100000	10000	690000	321	No	BKG, BSL
BERYLLIUM	5/6	0.21 - 0.74		0.39	A05DP00201	410	1.2	13.40	1300	1.15	No	BKG, BSL
CADMIUM	2/6	0.76 - 0.81		0.356	A05DP00201	100	93	1020	1800	[redacted]	No	BSL
CALCIUM	6/6	3570 - 143000		71333	A07DP00401	--	--	--	--	91477	No	BKG, NUT
CHROMIUM	5/6	5.8 - 21.2		13.4	A05DP00201	310000 (7)	450	10000	--	27.1	No	BKG, BSL
COBALT	5/6	4.9 - 9.4		6.36	A05DP00201	12000	2900	--	--	22.5	No	BKG, BSL
COPPER	6/6	8.4 - 19		16.4	A05DP00201	4200	7000	--	--	30.3	No	BKG, BSL
IRON	6/6	7190 - 26800		16046	A05DP00201	61000	100000	--	--	38170	No	BKG, BSL, NUT
LEAD	6/6	2.6 - 17.9		11.0	A07DP00401	--	1000	--	--	41.7	No	BKG, BSL
MAGNESIUM	6/6	3380 - 82900		24380	A07DP00401	--	--	--	--	157382	No	BKG, NUT
MANGANESE	6/6	208 - 430		328	A07DP00201	4100	4500	--	--	2190	No	BKG, BSL
NICKEL	5/6	12.5 - 22.7		17.4	A05DP00201	4100	3700	10000	13000	102	No	BKG, BSL
POTASSIUM	6/6	589 - 2480		1127	A07DP00201	--	--	--	--	[redacted]	No	NUT
SODIUM	5/6	117 - 790		301	A05DP00201	--	--	--	--	[redacted]	No	NUT
THALLIUM	4/6	0.86 - 3.3		1.72	A05DP00201	14	19	--	--	139	No	BKG, BSL
VANADIUM	6/6	11.1 - 56.1		29.4	A05DP00201	1400	4500	10000	--	61.9	No	BKG, BSL
ZINC	6/6	18.3 - 93.5		53	A05DP00201	61000	100000	10000	--	119	No	BKG, BSL

Notes:

1 - Data from the following sampling locations were included in the screening process: A05DP00201, A07DP00101, A07DP00201, A07DP00301, A07DP00401, A07DP00501
2 - U.S. EPA Region III Risk-based Concentration Table, April 12, 1999.
3 - U.S. EPA Region IX Preliminary Remedial Goals, May 1, 1998.
4 - IDEM Voluntary Remediation Program Resource Guide, October, 1995.
5 - U.S. EPA Soil Screening Guidance, May 1996.
6 - Rationale Codes
Above Screening Levels (ASL)
Background Levels (BKG)
Essential Nutrient (NUT)
Below Screening Level (BSL)
7 - Value is for trivalent chromium.
One-tenth the EPA Region III RBCs and EPA Region IX PRGs are presented for noncarcinogenic compounds.
Shaded bolded values indicate an exceedance of background and / or criteria.
ND - Not Detected
COPC - Chemicals of Potential Concern.

TABLE 10-15

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
DIRECT CONTACT EXPOSURE - RESIDENTIAL LAND USE SCENARIO
AOC 7 - EAST-WEST STORM SEWER - SUBSURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

Chemical	Frequency of Detection (1)	Range of Detection	Exposure Point Concentration	Average Concentrations Positive Hits	Location of Maximum	EPA Region III Risk-Based Concentrations (2) Residential	EPA Region IX Preliminary Risk-Based Goals (3) Residential	Indiana Tier II Cleanup Goals (4) Residential	Soil Screening Level (5) Soil to Air	Upper Tolerance Limit for Background	Selected as a COPC? Residential Yes or No	Rationale for Contaminant Deletion or Selection (6)
Volatiles (ug/kg)												
4-METHYL-2-PENTANONE	1/11	2		2	A07DP00303	630000	79000	1000000	—	ND	No	BSL
CARBON DISULFIDE	1/11	2		2	A07DP00203-MAX	780000	35000	—	720000	ND	No	BSL
Metals (mg/kg)												
ALUMINUM	11/11	2780 - 9090		6177	A07DP00503	[redacted]	[redacted]	—	—	22217	No	BKG
ANTIMONY	4/11	0.45 - 0.63		0.526	A07DP00103	3.1	3	584	—	[redacted]	No	BSL
ARSENIC	11/11	4.4 - 7		5.55	A07DP00503	[redacted]	[redacted]	490	750	21.3	No	BKG
BARIUM	11/11	33.8 - 70.1		46.3	A07DP00503	550	520	102200	690000	222	No	BKG, BSL
BERYLLIUM	7/11	0.16 - 0.44		0.30	A07DP00503	16	[redacted]	119.6	1300	1.13	No	BKG, BSL
CADMIUM	4/11	0.25 - 1.1		0.556	A07DP00403-MAX	3.9	3.7	730	1800	[redacted]	No	BSL
CALCIUM	11/11	52300 - 122000		86418	A07DP00102	—	—	—	—	914377	No	BKG, NUT
CHROMIUM	7/11	5.8 - 13.5		11.5	A07DP00202	12000 (7)	210	10000	—	27.1	No	BKG, BSL
COBALT	11/11	4.1 - 6.6		5.08	A07DP00503	470	330	—	—	32.1	No	BKG, BSL
COPPER	11/11	12.1 - 19.3		16.0	A07DP00503	310	290	—	—	30.2	No	BKG, BSL
IRON	11/11	11800 - 15100		13472	A07DP00302	2300	2200	—	—	30170	No	BKG, NUT
LEAD	11/11	3.8 - 12.1		6.61	A07DP00102	400 (8)	400	—	—	61.7	No	BKG, BSL
MAGNESIUM	11/11	14000 - 36200		23046	A07DP00203-MAX	—	—	—	—	157982	No	BKG, NUT
MANGANESE	11/11	227 - 478		342	A07DP00203-MAX	[redacted]	[redacted]	—	—	2130	No	BKG
NICKEL	11/11	14.7 - 21.9		18.4	A07DP00503	160	160	2000	13000	108	No	BKG, BSL
POTASSIUM	10/11	545 - 2030		1448	A07DP00403-MAX	—	—	—	—	1932	No	BKG, NUT
SODIUM	8/11	122 - 433		[illegible]	A07DP00403-MAX	—	—	—	—	[redacted]	No	NUT
THALLIUM	6/11	0.73 - 1.2		0.99	A05DP00203	[redacted]	[redacted]	—	—	[illegible]	No	BKG
VANADIUM	11/11	11.9 - 22.1		17.5	A07DP00103	55	52	16220	—	51.3	No	BKG, BSL
ZINC	11/11	39 - 64.2		49	A07DP00503	2300	2200	430000	—	114	No	BKG, BSL

Notes:

1 - Data from the following sampling locations were included in the screening process: A05DP0020, 2A05DP00203, A07DP00102, A07DP00103, A07DP00202, A07DP00203-MAX, A07DP00302
2 - U.S. EPA Region III Risk-based Concentration Table, April 12, 1999.
3 - U.S. EPA Region IX Preliminary Remedial Goals, May 1, 1998.
4 - IDEM Voluntary Remediation Program Resource Guide, October, 1995.
5 - U.S. EPA Soil Screening Guidance, May 1996.
6 - Rationale Codes
Above Screening Levels (ASL)
Background Levels (BKG)
Essential Nutrient (NUT)
Below Screening Level (BSL)
7 - Value is for trivalent chromium.
8 - OSWER screening level.
One-tenth the EPA Region III RBCs and EPA Region 1X PRGs are presented for noncarcinogenic compounds.
Shaded bolded values indicate an exceedance of background and / or criteria.
ND - Not Detected
COPC - Chemicals of Potential Concern.

TABLE 10-16

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
DIRECT CONTACT EXPOSURE - NONRESIDENTIAL LAND USE SCENARIO
AOC 7 - EAST-WEST STORM SEWER - SUBSURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

Chemical	Frequency of Detection (1)	Range of Detection	Exposure Point Concentration	Average Concentrations Positive Hits	Location of Maximum	EPA Region III Risk-Based Concentrations (2) Nonresidential	EPA Region IX Preliminary Risk-Based Goals (3) Nonresidential	Indiana Tier II Cleanup Goals (4) Nonresidential	Soil Screening Level (5) Soil to Air	Upper Tolerance Limit for Background	Selected as a COPC? Nonresidential Yes or No	Rationale for Contaminant Deletion or Selection (6)
Volatiles (mg/kg)												
4-METHYL-2-PENTANONE	1/11	2		2	A07DP00303	16000000	200000	1000000		ND	No	BSL
CARBON DISULFIDE	1/11	2		2	A07DP00203-MAX	20000000	120000	—	720000	ND	No	BSL
Metals (mg/kg)												
ALUMINUM	11/11	3790 - 8260		6177	A07DP00303	200000	100000	—	—	22217	No	BKG, BSL
ANTIMONY	4/11	0.46 - 0.63		0.555	A07DP00103	82	75	584	—	[illegible]	No	BSL
ARSENIC	11/11	4.4 - 7		6.00	[illegible]	[illegible]	[illegible]	400	750	21.3	No	BKG
BARIUM	11/11	33.5 - 70.1		46.3	[illegible]	14000	10000	102200	690000	232	No	BKG, BSL
BERYLLIUM	7/11	0.19 - 0.44		0.36	[illegible]	410	1.2	116.8	1300	[illegible]	No	BKG, BSL
CADMIUM	4/11	0.66 - 1.1		0.836	A07DP00203-MAX	100	93	730	1800	[illegible]	No	BSL
CALCIUM	11/11	32900 - 132000		66443	[illegible]	—	—	—	—	[illegible]	No	BKG, NUT
CHROMIUM	7/11	6.9 - 13.1		11.5	[illegible]	200000 (7)	450	—	—	27.1	No	BKG, BSL
COBALT	11/11	4.1 - 8.5		6.09	[illegible]	12000	2900	—	—	22.5	No	BKG, BSL
COPPER	11/11	13.1 - 18.3		16.0	[illegible]	8200	7600	—	—	30.3	No	BKG, BSL
IRON	11/11	[illegible]		[illegible]	[illegible]	61000	100000	—	—	[illegible]	No	BKG, BSL
LEAD	11/11	3.8 - 12.1		6.61	[illegible]	—	1000	—	—	[illegible]	No	BKG, BSL
MAGNESIUM	11/11	[illegible]		[illegible]	A07DP00203-MAX	—	—	—	—	[illegible]	No	BKG, BSL, NUT
MANGANESE	11/11	227 - 476		342	A07DP00203-MAX	4100	4800	—	—	2130	No	BKG, BSL
NICKEL	11/11	14.7 - 21.6		16.4	[illegible]	4100	3700	[illegible]	[illegible]	[illegible]	No	BKG, BSL
POTASSIUM	10/11	[illegible]		[illegible]	A07DP00203-MAX	—	—	—	—	[illegible]	No	BKG, NUT
SODIUM	6/11	122 - 483		[illegible]	A07DP00203-MAX	—	—	—	—	[illegible]	No	NUT
THALLIUM	5/11	0.73 - 1.2		0.89	A05DP00203	14	13	—	—	[illegible]	No	BKG, BSL
VANADIUM	11/11	11.9 - 22.1		17.6	[illegible]	[illegible]	[illegible]	[illegible]	—	51.3	No	BKG, BSL
ZINC	11/11	30 - 64.2		49	[illegible]	61000	100000	[illegible]	—	[illegible]	No	BKG, BSL

Notes:

1 - Data from the following sampling locations were included in the screening process: A05DP0020, 2A05DP00203, A07DP00102, A07DP00103, A07DP00202, A07DP00203-MAX, A07DP00302

2 - U.S. EPA Region III Risk-based Concentration Table, April 12, 1999.

3 - U.S. EPA Region IX Preliminary Remedial Goals, May 1, 1998.

4 - IDEM Voluntary Remediation Program Resource Guide, October, 1995.

5 - U.S. EPA Soil Screening Guidance, May 1996.

6 - Rationale Codes
- Above Screening Levels (ASL)
- Background Levels (BKG)
- Essential Nutrient (NUT)
- Below Screening Level (BSL)

7 - Value is for trivalent chromium.

One-tenth the EPA Region III RBCs and EPA Region IX PRGs are presented for noncarcinogenic compounds.

Shaded bolded values indicate an exceedance of background and / or criteria.

ND - Not Detected

COPC - Chemicals of Potential Concern.

TABLE 10-17

SELECTION OF COPCs FOR HUMAN HEALTH RISK ASSESSMENT
GROUNDWATER PROTECTION EVALUATION
AOC 7 - THE EAST-WEST STORM SEWER - SURFACE AND SUBSURFACE SOIL
PHASE I & II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER INDIANAPOLIS
MARION COUNTY, INDIANA

Chemical	Maximum Concentration (1)		Indiana Tier II Cleanup Goals (2)		EPA Region IX Soil Screening Level (3)	Upper Tolerance Limit for Background	Selected as a COPC?	
	Surface Soil	Subsurface Soil	Non Residential	Residential	Soil to Groundwater		Industrial Yes or No	Residential Yes or No
Volatile Organic Compounds (ug/kg)								
4-methyl-2-pentanone	ND	2	407460	58147	—	ND	No	No
Carbon Disulfide	ND	2	—	—	32000	ND	No	No
Toluene	2	ND	1000000	202180	12000	ND	No	No
Metals (mg/kg)								
Aluminum	13600	9060	—	—	—	22217	NC	NC
Antimony	0.61	0.63	—	—	5	[illegible]	No	No
Arsenic	14.9	7	—	—	29	21.3	No	No
Barium	113	70.1	—	—	1600	222	No	No
Beryllium	0.74	0.44	—	—	63	1.13	No	No
Cadmium	0.91	1.1	—	—	8	[illegible]	No	No
Calcium	142000	122000	—	—	—	914377	NC	NC
Chromium	21.2	13.9	—	—	38	27.1	No	No
Cobalt	9.4	6.6	—	—	—	22.6	NC	NC
Copper	19	19.3	—	—	—	30.3	NC	NC
Iron	29000	15100	—	—	—	30170	NC	NC
Lead	17.9	12.1	—	—	—	61.7	NC	NC
Magnesium	52300	36200	—	—	—	157362	NC	NC
Manganese	430	478	—	—	—	2130	NC	NC
Nickel	22.7	21.9	—	—	130	109	No	No
Potassium	2480	2830	—	—	—	[illegible]	NC	NC
Sodium	798	433	—	—	—	[illegible]	NC	NC
[illegible]	3.3	1.2	—	—	[illegible]	[illegible]	Yes	Yes
Vanadium	36.1	22.1	—	—	6000	51.3	No	No
Zinc	83.5	84.2	—	—	12000	113	No	No

NOTES:

1 - Data from the following sampling locations were included in the screening process: A07DP00101, A07DP00102, A07DP00103, A07DP00201, A07DP00202, A07DP00203-MAX, A07DP00301, A07DP00302, A07DP00303, A07DP00401, A07DP00403-MAX, A07DP00501, A07DP00502, A07DP00503.

2 - IDEM Voluntary Remediation Program Resource Guide, October, 1995.

3 - U.S. EPA Region IX Preliminary Remedial Goals, May 1, 1998.

Shaded bolded values indicate an exceedance of criteria.

ND - Not Detected

COPC - Chemicals of Potential Concern.

ND - No criteria available.

TABLE 10-19

CHEMICALS RETAINED AS COPCs
AOC 7 - THE EAST-WEST STORM SEWER
NAVAL AIR WARFARE CENTER
MARION COUNTY, INDIANA

	Surface Soil		Subsurface Soil		Soil to Air		Soil to Groundwater	
Chemical	**Residential**	**Non-Residential**	**Residential**	**Non-Residential**	**Surface Soil**	**Subsurface Soil**	**Residential**	**Non-Residential**
Metals								
Thallium							X	X

Notes:
An X indicates that the maximum detected concentration exceeded the screening criteria.

TABLE 10-20

TERRESTRIAL FLORA AND FAUNA COPC SELECTION TABLES - AOC 7
PHASE II REMEDIAL INVESTIGATIONS
NAVAL AIR WARFARE CENTER, INDIANAPOLIS
MARION COUNTY, INDIANA

Chemical	Frequency of Detection	Range of Detections			Location of Maximum	Ecological Screening Level (1)	Number Exceeding Screening Level	Background Concentration	Number Exceeding Background Concentration	Selected as a COPC?	Rational
		Min.	Max.	Avg. All							
Volatile Organics (ug/kg)											
TOLUENE	1/5	2.0	2.0	2.0	AOC07DP04	1400	0	ND	NA	N	Below screening value
Inorganics (mg/kg)											
ALUMINUM	5/5	2360	9830	6364	AOC07DP02	50	5	22217	0	N	Below background
ANTIMONY	2/5	0.44	0.52	0.5	AOC07DP02	5	0	ND	NA	N	Below screening value
ARSENIC	5/5	2.7	6.8	5.5	AOC07DP01	19	0	21.3	0	N	Below screening value
BARIUM	5/5	15.9	68.5	48.3	AOC07DP01	412.5	0	222	0	N	Below screening value
BERYLLIUM	4/5	0.21	0.42	0.26	AOC07DP02	10	0	1.1	0	N	Below screening value
CADMIUM	1/5	0.76	0.76	0.39	AOC07DP01	3.8	0	ND	NA	N	Below screening value
CALCIUM	5/5	9160	142000	85552	AOC07DP04	NV	NA	914377	0	N	Low toxicity
CHROMIUM	4/5	5.6	15.4	10.3	AOC07DP02	64	0	27.1	0	N	Below screening value
COBALT	4/5	4.5	7.5	4.7	AOC07DP01	130	0	22.5	0	N	Below screening value
COPPER	5/5	8.4	18.9	14.6	AOC07DP01	63	0	30.3	0	N	Below screening value
IRON	5/5	7190	14200	12258	AOC07DP02	NV	NA	30170	0	N	Below background
LEAD	5/5	2.5	17.9	9.6	AOC07DP01	70	0	61.7	0	N	Below screening value
MAGNESIUM	5/5	4580	52300	28596	AOC07DP04	NV	NA	157362	0	N	Low toxicity
MANGANESE	5/5	268	430	337	AOC07DP01	500	0	2130	0	N	Below screening value
NICKEL	4/5	12.5	18.9	13.7	AOC07DP01	122.5	0	108	0	N	Below screening value
POTASSIUM	5/5	369	2460	1100	AOC07DP05	NV	NA	1832	1	N	Low toxicity
SODIUM	4/5	117	258	147	AOC07DP05	NV	NA	120	3	N	Low toxicity
THALLIUM	3/5	1.0	1.4	1.0	AOC07DP02	1	2	2.7	0	N	Below background
VANADIUM	5/5	11.1	22.4	17.2	AOC07DP02	130	0	51.3	0	N	Below screening value
ZINC	5/5	19.3	60.5	47.5	AOC07DP01	200	0	113	0	N	Below screening value

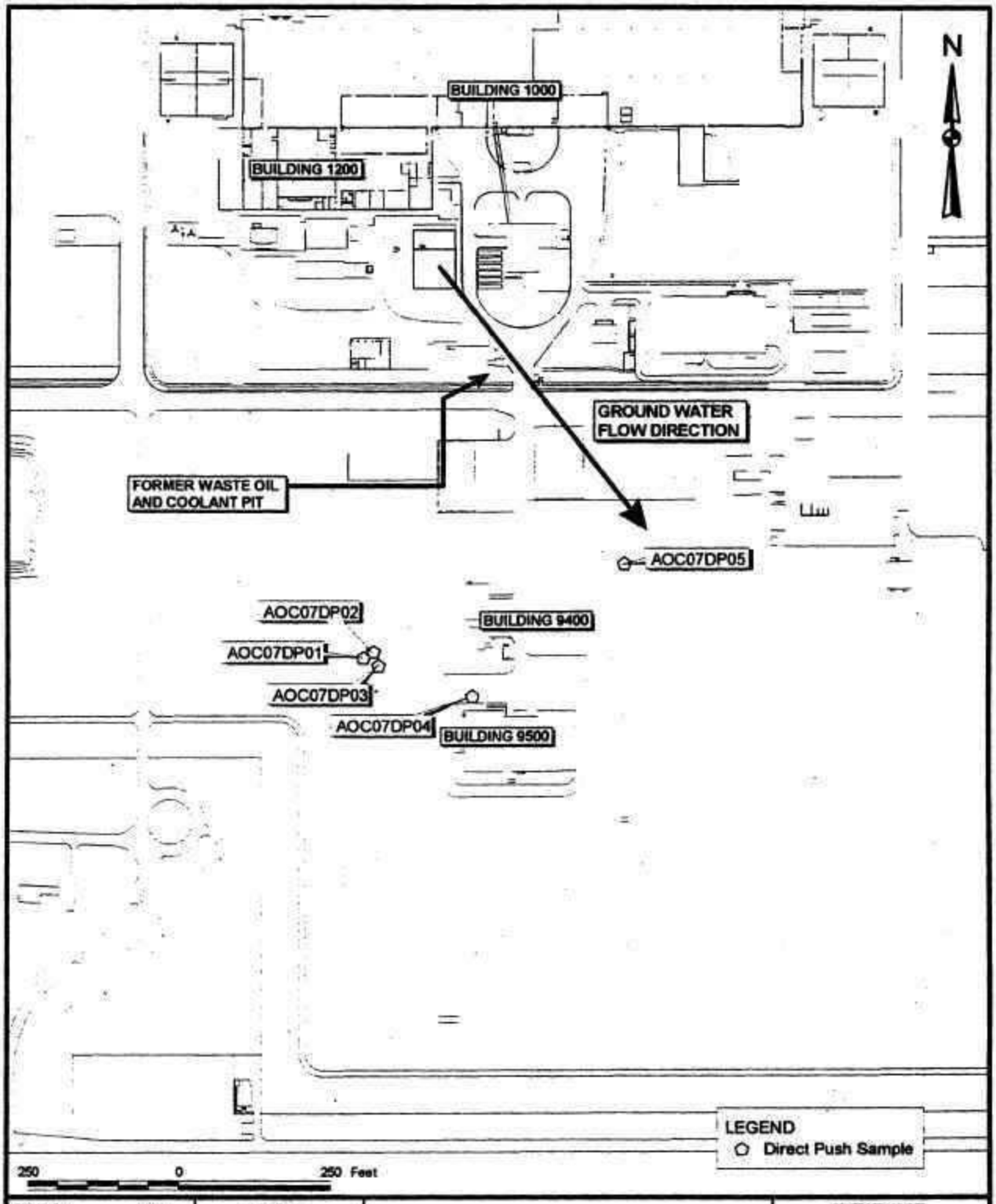
NA - Not Applicable
ND - Not Detected
NV - No Value Established
(1) References for screening levels are presented on Table 2-17

TABLE 10-22

SUMMARY OF TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENTS - AOC 7
CONSERVATIVE AND AVERAGE INPUTS
PHASE I AND II REMEDIAL INVESTIGATION
NAVAL AIR WARFARE CENTER, INDIANAPOLIS
MARION COUNTY, INDIANA

	Conservative Inputs				Average Inputs			
	Meadow Vole		American Robin		Vole		Robin	
COPCs	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l
Volatile Organics								
TOLUENE	8.50E-05	8.50E-06	--	--	5.85E-06	5.85E-07	--	--
Inorganics								
ANTIMONY		4.60E-01	--	--		1.38E-01	--	--
CADMIUM		3.79E-01			2.80E-01	2.80E-02		4.13E-01

-- No toxicity data was available for this contaminant so an HQ could not be calculated
Shaded cells are contaminants with HQs greater than 1
HQn - Hazard Quotient for the NOAEL
HQl - Hazard Quotient for the LOAEL



DRAWN BY: CHAD P. GLICK	DATE: 25-June-99	AOC 7 RI SAMPLING LOCATIONS EAST-WEST STORM SEWER AOC 7 DECISION DOCUMENT NAVAL AIR WARFARE CENTER INDIANAPOLIS MARION COUNTY, INDIANA	CONTRACT NUMBER: 12
CHECKED BY:	DATE:		APPROVED BY: K. HENN DATE: 6/25/99
COST/SCHEDULE-AREA:			APPROVED BY: DATE: 7/1/99
SCALE: AS NOTED			DRAWING NO: FIGURE A-1 REV: 1

P:\GIS\7173\175_PROPOSED_PLAN APR 6/25/99 CPG AOC 7 LOCATION LAYOUT

AOC 7

APPENDIX B

INSTITUTIONAL CONTROL PLAN

AREA OF CONCERN (AOC) 7 IC PLAN

A. DESCRIPTION OF THE SITE:

AOC 7 consists of the Transferable Portion of the East – West Storm Sewer centrally located at the NAWC Indianapolis facility. The NAWC is located in Marion County, east of downtown Indianapolis and is bordered by East 21st Street to the north, Arlington Avenue to the west, East 16th Street to the south and Windsor Branch, a surface water tributary to the east.

B. IDENTIFICATION OF RESIDUAL RISK(S) PRESENTED:

Thallium was the only chemical in soil at AOC 7 with concentrations exceeding federal and state risk-based screening criteria. Residential criteria for the protection of groundwater as a drinking water source for thallium was the only criteria exceeded. No groundwater samples were collected at AOC 7, consequently, it is not known if thallium has migrated from soil to groundwater. Thallium was not detected in groundwater samples taken downgradient of the site at concentrations exceeding applicable criteria. Based upon the data collected at AOC 7, the residual risk presented is from the potential for thallium to migrate from soil to groundwater and potentially impact the quality of the groundwater.

C. TYPES OF ICS IMPOSED:

The Navy intends on utilizing deed provisions to impose upon future transferees, their successors, assigns, lessees or licensees of the real property and facilities which encompass AOC 7, those restrictions necessary to ensure continued protection of human health and the environment. Those restrictions may be summarized as follows:

1. A prohibition against residential or residential-like uses of the property without prior authorization from the Navy (the reasonable anticipated future use at this site is industrial);

2. A requirement for annual compliance reporting by the future owner(s) of the NAWC property of the fact that only industrial uses of the property have been allowed

D. PROPOSED DEED LANGUAGE IMPLEMENTING ICS:

The following land and groundwater use restriction provisions or their substantial equivalents will be incorporated into the quitclaim deed which shall effect the transfer of the property and facilities encompassing AOC 7 to any transferee:

1. The Grantee its successors, assigns, lessees, and licensees are prohibited from utilizing any portion of the real property and facilities encompassing AOC 7 as depicted in the attached survey for residential or residential type uses without the prior written authorization from the Navy. Such prohibited uses shall include, but not be limited to, nurseries, child or full time adult day care facilities or any playground area. Any additional site evaluation(s), risk assessment(s) and potential remedial measures as may be necessary if future usage of the property is for other than industrial purposes shall be without costs to the United States.

E. PARTY RESPONSIBLE FOR MONITORING THE INTEGRITY AND EFFECTIVENESS OF IMPOSED CONTROL(S):

The Navy intends on maintaining responsibility for overseeing the integrity and effectiveness of the IC remedy selected for AOC 7. The Navy plans on doing this by requiring annual IC compliance reporting by subsequent transferees of the property and facilities encompassing this site and by conducting all required CERCLA Five-Year Reviews.

F. PROCEDURES FOR REPORTING AND ENFORCING AGAINST IC VIOLATIONS

Should the Navy learn that any subsequent owner, occupant or third party has violated or caused to be violated any IC associated with AOC 7, the Navy shall evaluate at that time whether it would be appropriate to exercise the response authorities granted to it under CERCLA Section 104 (42 USC 9604), the Defense Environmental Restoration Program (DERP) (10 USC 2701 et. seq.) and Executive Order 12580, in order to ensure continued protectiveness of the site remedy implemented. The Navy will also evaluate the appropriateness of pursuing whatever rights it may have contractually or otherwise and/or for cost recovery under CERCLA Section 107 (42 USC 9607) against the violator of that IC(s). The Navy shall also promptly notify by letter the appropriate IDEM and U.S. EPA representatives upon learning of any IC violation(s) so that U.S. EPA can initiate whatever enforcement action U.S. EPA may believe to be appropriate at that time against such violator(s).

To ensure the opportunity for the Navy and U.S. EPA to be able to enforce the lCs associated with AOC 7, the Navy shall insert the following provisions or their substantial equivalent into the quitclaim deed which shall effect the transfer of the property encompassing AOC 7 to any third party:

1. The Navy reserves a right of access to all portions of the property for environmental investigation, remediation or other corrective actions. This reservation includes the right of access to and use of, to the extent permitted by law, available utilities at reasonable cost. These rights shall be exercisable in any case in which a remedial action, response action or corrective action is found to be necessary by the Navy after the date of conveyance of the property, or in which access is

necessary to carry out a remedial action, response action or corrective action on adjoining property. Pursuant to this reservation, the Navy, the U.S. EPA and the State of Indiana, and their officers, agents, employees, contractors and subcontractors shall have the right (upon reasonable notice to the Grantee or the then owner and any authorized occupant of the property) to enter upon the Property and conduct investigations and surveys, to include drillings, test-pitting, borings, data and record compilation, and other activities related to environmental investigation and to carry out remedial or removal actions as required or necessary under applicable authorities, including but not limited to monitoring wells, pumping wells, and treatment. Any such entry, including such activities, responses or remedial actions, shall be coordinated with the Grantee or its successors assigns, and tenants and shall be performed in a manner which minimizes interruption with Grantee's activities on the property.

2. The Grantee, its successors, assigns, lessees and licensees are prohibited from unreasonably interfering with any environmental investigation or remedial activities to be undertaken by the Navy on the property encompassing AOC 7 or surrounding NAWC property.

G. ASSURANCES REGARDING COMPLETION OF THE CERCLA FIVE-YEAR REVIEW PROCESS:

It is the Navy's intent to fully comply with the requirements of CERCLA as they may continue to apply to AOC 7 and to continue in part to oversee the long term effectiveness of the selected remedy through the timely undertaking and completion of CERCLA Five-Year Reviews.

H. IC RECORDATION / NOTICE REQUIREMENTS:

Those specific ICs reflected in this ICP and in the Proposed Plan (PP) and Decision Document (DD) for AOC 7 will be reflected in the quitclaim deed which shall be used to effect the transfer of the property encompassing AOC 7 and such deed will be recorded in the appropriate local property records office for the property by the transferee(s) of the real property upon which the site is situated. The transferee will be provided advance notice of those ICs and all pertinent site conditions by first being provided with a copy of this plan, the Environmental Baseline Survey (EBS) and requisite Finding of Suitability to Transfer (FOST) prepared by the Navy in connection with such transfer.

I. COMMITMENT TO PRE-TRANSFER MEETING:

To the extent appropriated funds may be available for such purposes, the Navy commits to meet at least five days before transfer with any and all prospective transferees of the real property and facilities encompassing AOC 7 in order to ensure that such transferee(s) fully understands the provisions of this plan.